

Air Force Plant 44 (AFP-44)/Raytheon Project Area (Part of the TIAA CERCLA Site)

Boundaries:

This project area is located in the southern portion of the Tucson International Airport Area (TIAA) site. The plant is located about eight miles south of downtown Tucson and is bounded to the north and east by the Tucson International Airport, to the south by Hughes Access Road and to the west by the Nogales Highway (Route 89).

Site History:

- This site is a federally-owned weapons manufacturing facility operated under contract by the Raytheon Company (formerly Hughes Missile Systems). The facility occupies over two million square feet of buildings.
- Past waste disposal practices included: industrial wastewater treatment, storage, and disposal; discharge of wastes into unlined surface impoundments; and land disposal of industrial wastewater, spent solvents, and dilute and concentrated acids and alkalines.
- Waste disposal practices led to widespread soil and groundwater contamination at the site. Resulting groundwater contamination has spread northward beyond the project area boundaries because of the regional groundwater flow gradient.
- Groundwater contamination was first noted in the early 1950's when elevated levels of chromium were detected in a municipal water supply well near AFP-44 and when residents near the Tucson International Airport complained about water quality problems in their private wells.
- In 1976, the state of Arizona closed a well at AFP-44 due to high levels of chromium. In early 1981, the U.S. EPA and the Arizona Department of Health Services (ADHS) identified volatile organic compounds (VOCs) in the upper zone of regional aquifer beneath the Tucson International Airport.
- Beginning in 1981, the City of Tucson closed all municipal wells that exceeded the state action level for trichloroethene (TCE), the primary groundwater contaminant, and notified private well users of the potential risks.
- In 1983, the TIAA Superfund site (which includes the Air Force Plant 44 project area) was added to the National Priorities List. Soon thereafter, the U.S. Air Force began an extensive investigation of groundwater contamination at the AFP-44 site which revealed high levels of TCE in the groundwater.

- In 1985, the U.S. Air Force issued a Record of Decision (ROD) for the regional groundwater at AFP-44, and a large groundwater remediation system was constructed in 1987.
- In 1991 and 1992, a Remedial Investigation (RI) of soil contamination at AFP-44 was conducted with supplemental field work being completed in 1993 and 1995. In 1993, a risk assessment was performed to identify soil sites that required remediation.
- In 1994, a Feasibility Study (FS) for soil remediation was completed.
- From 1994 to 1996, dual-phase-extraction (DPE) systems were installed to treat VOC contaminated soils and groundwater. In 1996, large-scale soil-vapor-extraction (SVE) systems were built to remove VOCs from soils.
- In 1996 and 1997, the U.S. Air Force produced a new ROD that specified SVE treatment of VOC contaminated soils at AFP-44.
- Since 1995, nearly 57,000 tons of metals-contaminated soils (cadmium, chromium, lead, were excavated and removed from the site.

Site Status:

- In 1987, a large-scale pump, treat, and reinjection system was installed to provide containment and remediation of regional aquifer groundwater contamination. This system, which is currently pumping and treating about 1,500 gallons per minute, has removed approximately 23,650 pounds of VOCs, and treated nearly 23.6 billion gallons of groundwater.
- DPE systems have been installed at some regional aquifer extraction wells to accelerate the removal of VOCs.
- A shallow groundwater zone is currently being remediated with a DPE system. This system pumps and treats shallow groundwater and lowers the water table to expose more vadose zone to SVE treatment, thereby accelerating VOC removal.
- SVE systems have also been used to remediate source areas.
- In September 2000, one source area (Site 1) was closed after vadose zone contamination was reduced to a level where groundwater will not be impacted above the maximum contaminant level (MCL).
- At Site 2, post-SVE monitoring has been completed. Vadose zone contamination was reduced to a level that will not impact groundwater above the TCE MCL, and the site has been closed.

- Together, the DPE and SVE systems have removed over 107,300 pounds of VOCs from subsurface soils.
- The University of Arizona continues investigations of enhanced groundwater remediation. Past studies have included vertical recirculation wells, and flushing the aquifer with cyclodextran. The University and Raytheon have also conducted tests of in-situ TCE remediation using potassium permanganate as a TCE oxidizer.
- During the spring and summer 2002, 1,4-dioxane was discovered at the site in concentrations ranging from 1.0 to 54 parts per billion (ppb). In 2004, an additional monitoring well at AFP-44 had 600 ppb 1,4-dioxane. Currently used remedial technologies are ineffective in removing 1,4-dioxane, therefore, this contaminant has inadvertently been reinjected into the aquifer and spread northward into the TARP plume.
- ADEQ, EPA, the U.S. Air Force and Raytheon are working together to determine what, if any, remedial actions might be necessary for 1,4-dioxane. There is no drinking water standard for 1,4-dioxane, but the U.S. EPA is developing a site-specific risk-based cleanup goal for 1,4-dioxane at the TIAA site. EPA has asked the U.S. Air Force to conduct a new RI/FS to focus on 1,4-dioxane contamination at the TIAA site.

Site Hydrogeology:

- The regional aquifer beneath most of AFP-44 is divided into three main hydrogeologic units including the upper zone, a middle aquitard, and the lower zone.
- The middle aquitard pinches out several miles north of the site where the three aquifer units merge into one regional undivided aquifer.
- The upper zone (where nearly all of the groundwater contamination is present) is composed of layers of gravelly sand interbedded with clayey sand and sandy clay. A low permeability layer of clay and silt occurs near the potentiometric surface within the upper zone which, due to its hydraulic properties, retains high concentrations of VOCs.
- In 1987, the depth to groundwater at AFP-44 was from 90 to 140 feet below ground surface prior to the startup of the groundwater pump and treat system. Under ambient conditions, groundwater flow in the upper zone is toward the northwest. Currently, the depth to groundwater ranges from 90 to 160 feet below ground surface.

Contaminants:

The current contaminants of concern in soil and groundwater include metals and VOCs, including trichloroethene (TCE). In addition, 1,4-dioxane was recently discovered. Contaminants of concern at the site may change as new data become available.

Public Health Impact:

All municipal wells in the area that were contaminated with VOCs have been shut down. The municipal water supply in the area now comes from wells outside the site and water produced from these wells meets all state and federal drinking water standards. Some privately owned domestic use wells in the area have been impacted but have either been shut down or converted to irrigation wells. Areas with soil contamination at or very close to the surface have been excavated so that there are no known public health impacts from contaminated soils.

Community Involvement Activities:

To provide community members with an opportunity to learn about the cleanup process and to obtain local perspective for decisions concerning the cleanup, a Unified Community Advisory Board (UCAB) was formed in 1995. The UCAB meets the third Wednesday of January, April, July, and October. These meetings occur at 6:00 p.m. at the El Pueblo Community Center located at 101 W. Irvington Rd. in Tucson and are open to the public.

Recent EPA fact sheets include: *EPA Proposes Plan to Address Groundwater Contamination at West-Cap and West Plume B Project Areas* (June 2002). In addition, the U.S. Air Force publishes a semi-annual progress report for activities at Air Force Plant 44. The Air Force and Raytheon are also active participants in the annual Earth Day celebration in Tucson, and in education and outreach to Tucson schools.

Information Repositories:

Interested parties can review site information at the information repository at the TCE Superfund Information Library located at 101 W. Irvington Road, within the El Pueblo Branch Library in Tucson, (520) 889-9194. Site information is also available at both ADEQ's Southern Regional Office located at 400 W. Congress, Suite 433 in Tucson, and the main office located at 1110 W. Washington Street in Phoenix. Files are available for review Monday through Friday from 8:00 a.m. to 5:00 p.m. Please call (520) 628-6715 to arrange a file review appointment at the Southern Regional Office. To arrange for a time to review the site file at the main ADEQ office, please call the ADEQ Records Center (602) 771-4378 or (800) 234-5677 (Arizona toll-free).

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*In Arizona, but outside the Tucson area, call toll-free at (888) 271-9302.

**Call EPA's toll-free message line at (800) 231-3075.